



SR 400 (I-4) Project Development and Environment (PD&E) Study
FM No.: 432100-1-22-01



Air Quality Analysis Technical Memorandum

**Segment 4: State Road 400 (SR 400)/Interstate 4 (I-4)
from East of SR 15-600/US 17-92 (Seminole/Volusia County Line)
to ½ Mile East of SR 472**

Volusia County (79110), Florida

July 2016



AIR QUALITY ANALYSIS

TECHNICAL MEMORANDUM

Date: July 2016

To: FDOT District 5 through HNTB Corporation

From: John Moore Jr., PE, Stantec Consulting Services, Inc.

Subject: PD&E Study for Interstate 4 Segment 4: from east of SR 15/600 (US 17/92) to ½ mile east of SR 472

Re: Air Quality Screening

FDOT is proposing to reconstruct and widen I-4 as part of the I-4 Beyond the Ultimate (BtU) concept. This involves the build-out of I-4 to its ultimate condition through Central Florida, including segments in Polk, Osceola, Orange, Seminole and Volusia Counties. The concept design proposes the addition of two new express lanes in each direction, resulting in a total of ten dedicated lanes. The project limits for the segment analyzed in this report are within an approximate ten (10) mile segment of I-4 which extends from east of US 17/92 to east of SR 472, from Milepost 0.086 to 10.227 in Volusia County (herein referred to as I-4, Segment 4) . Although, the interstate is a designated east-west corridor, the alignment follows a southwest to northeast orientation through the limits of Segment 4. The study area in this section from east of US 17/92 to east of SR 472 includes the interchanges at Dirksen Drive/Debary Avenue, Saxon Boulevard and SR 472/Howland Boulevard. A new interchange with I-4 providing direct access only to the express lanes is proposed to be constructed about halfway between Saxon Boulevard and SR 472, with the Rhode Island Avenue extension.

The proposed improvements to I-4 include widening the existing six lane divided urban interstate to a ten lane divided highway. The existing typical section for the I-4 mainline consists of three 12-foot travel lanes in each direction. The outside and inside shoulders are 12 feet wide with 10 feet paved. The median width varies from 37 feet to 375 feet and the existing right of way (ROW) varies from 300-feet to 630-feet. The typical section in the proposed condition will have three 12-foot general use travel lanes with a 10-foot inside and 12-foot outside shoulder and two 12-foot express lanes with a 4-foot inside and 10-foot outside shoulder, in each direction. A barrier wall between adjacent 10-foot shoulders will separate the express lanes from the general use lanes. Additionally, auxiliary lanes in both the eastbound and westbound directions will be provided in some areas.

The land use adjacent to I-4 within the proposed project limits consists primarily of natural lands and Residential with some Commercial and Services along adjacent roads. Undeveloped natural areas are located between the St. Johns River and Padgett Creek, north of Saxon Boulevard on both sides of the right-of-way, along the majority of the SR 472 interchange, and various other small isolated patches throughout the corridor. In the southern portion of the project area, Gemini Springs County Park is located to the west of I-4 and Lake Monroe is located to the east of I-4. Several smaller lakes are located adjacent to the proposed project limits.

The referenced proposed project was reviewed for air quality impacts consistent with the guidance provided by the Federal Highway Administration (FHWA). Seminole and Volusia Counties are currently areas that are designated as being *attainment* for the following air pollutants: *ozone, nitrogen dioxide, particulate matter (2.5 microns in size and 10 microns in size), sulfur dioxide, carbon monoxide, and lead.*

The project was subjected to a carbon monoxide (CO) screening model that makes various conservative worst-case assumptions related to site conditions, meteorology and traffic. The FDOT's screening model, CO Florida 2012 (released March 12, 2012) uses the United States Environmental Protection Agency (USEPA) – approved software (**MOVES 2010a and CAL3QHC2**) to produce estimates of one-hour and eight-hour CO at default air quality receptor locations. The one-hour and eight-hour estimates can be directly compared to the one-hour and eight-hour **National Ambient Air Quality Standards (NAAQS)** for CO that are 35 parts per million (ppm) and 9 parts per million (ppm), respectively.

The roadway intersection forecast to have the highest total approach traffic volume (for both the Build and No-Build scenarios) is the intersection of the western I-4 ramps at SR 472. However, this intersection is located in a mostly natural wooded area and is not near any CO reception sites. Although the intersection of the eastern I-4 ramps at DeBary Avenue is not projected to have the highest total approach traffic volume for this project segment (for both the Build and No-Build scenarios), it was selected as the intersection to analyze based on its proximity to CO reception sites and relatively high volume of vehicles per hour (vph). The Build and No-Build scenarios for the opening year (2020) and the design year (2040) were evaluated (for design hour volumes). The traffic data input used in the evaluation is attached to this memorandum.

Estimates of CO were predicted for the default receptors which are located 10 feet to 150 feet from the edge of the roadway. Based on the results from the screening model, the highest project-related CO one-hour and eight-hour levels are not predicted to meet or exceed the one-hour or eight-hour **National Ambient Air Quality Standards (NAAQS)** for this pollutant with either the Build or No-Build alternatives. As such, the project “passes” the screening model. The results of the screening model are attached to this memorandum.

The project is located in an area which is designated attainment for all of the **National Ambient Air Quality Standards** under the criteria provided in the **Clean Air Act**. Therefore, the **Clean Air Act** conformity requirements do not apply to the project.

References:

FDOT's PD&E Manual – Part 2, Chapter 16 “Air Quality Analysis” (09-13-06)

TRAFFIC DATA FOR AIR QUALITY ANALYSIS

Date: April 8, 2014

Prepared by: John Moore Jr., PE

Project Description: PD&E Study for Interstate 4 from US 17/92 to east of SR 472

Opening Year: 2020

Land Use: Urban

Intersection: Eastern I-4 ramps at DeBary Avenue

Intersection Type		EB (vph)	WB (vph)	SB (vph)	Speed (mph)
Build	North Tee	317	899	1,362	25 – 45*
No-Build	North Tee	726	1,970	1,736	25 – 45*

*All three directions have different posted speed limits: eastbound DeBary Avenue is 35 mph, westbound DeBary Avenue is 45 mph, and the ramp from I-4 to DeBary Avenue is 25 mph.

Design Year: 2040
Land Use: Urban
Intersection: Eastern I-4 ramps at DeBary Avenue

Intersection Type		EB (vph)	WB (vph)	SB (vph)	Speed (mph)
Build	North Tee	1,293	1,390	1,418	25 – 45*
No-Build	North Tee	796	2,116	1,831	25 – 45*

*All three directions have different posted speed limits: eastbound DeBary Avenue is 35 mph, westbound DeBary Avenue is 45 mph, and the ramp from I-4 to DeBary Avenue is 25 mph.

CO Florida 2012 - Results
 Tuesday, April 08, 2014

Project Description

Project Title I-4 PD&E Air Quality
 Facility Name Stantec
 User's Name Mike Holdsworth
 Run Name Segment 4 Build
 FDOT District 5
 Year 2020
 Intersection Type North Tee
 Speed Arterial 25 mph
 Approach Traffic Arterial 1362 vph

Environmental Data

Temperature 47.8 °F
 Reid Vapor Pressure 13.3 psi
 Land Use Urban
 Stability Class D
 Surface Roughness 175 cm
 1 Hr. Background Concentration 5.0 ppm
 8 Hr. Background Concentration 3.0 ppm

Results
 (ppm, including background CO)

Receptor	Max 1-Hr	Max 8-Hr
1	5.7	3.4
2	5.7	3.4
3	6.0	3.6
4	5.8	3.5
5	5.8	3.5
6	5.8	3.5
7	5.9	3.5
8	6.0	3.6
9	6.0	3.6
10	6.1	3.7
11	5.9	3.5
12	5.9	3.5
13	5.9	3.5
14	5.9	3.5
15	6.0	3.6
16	5.8	3.5
17	5.8	3.5

 *****PROJECT PASSES*****
 NO EXCEEDANCES OF NAAQ STANDARDS ARE PREDICTED

CO Florida 2012 - Results
Tuesday, April 08, 2014

Project Description

Project Title I-4 PD&E Air Quality
Facility Name Stantec
User's Name Mike Holdsworth
Run Name Segment 4 No-Build
FDOT District 5
Year 2020
Intersection Type North Tee
Speed Arterial 25 mph
Approach Traffic Arterial 1970 vph

Environmental Data

Temperature 47.8 °F
Reid Vapor Pressure 13.3 psi
Land Use Urban
Stability Class D
Surface Roughness 175 cm
1 Hr. Background Concentration 5.0 ppm
8 Hr. Background Concentration 3.0 ppm

Results
(ppm, including background CO)

Receptor	Max 1-Hr	Max 8-Hr
1	5.7	3.4
2	5.9	3.5
3	6.3	3.8
4	6.2	3.7
5	6.0	3.6
6	6.2	3.7
7	6.2	3.7
8	6.3	3.8
9	6.3	3.8
10	6.1	3.7
11	6.1	3.7
12	6.1	3.7
13	6.1	3.7
14	6.2	3.7
15	6.4	3.8
16	6.0	3.6
17	6.0	3.6

*****PROJECT PASSES*****
NO EXCEEDANCES OF NAAQ STANDARDS ARE PREDICTED

CO Florida 2012 - Results
Monday, January 05, 2015

Project Description

Project Title I-4 PD&E Air Quality
Facility Name Stantec
User's Name Mike Holdsworth
Run Name Segment 4 Build
FDOT District 5
Year 2040
Intersection Type North Tee
Speed Arterial 25 mph
Approach Traffic Arterial 1418 vph

Environmental Data

Temperature 47.8 °F
Reid Vapor Pressure 13.3 psi
Land Use Urban
Stability Class D
Surface Roughness 175 cm
1 Hr. Background Concentration 5.0 ppm
8 Hr. Background Concentration 3.0 ppm

Results
(ppm, including background CO)

Receptor	Max 1-Hr	Max 8-Hr
1	5.5	3.3
2	5.7	3.4
3	5.8	3.5
4	5.7	3.4
5	5.7	3.4
6	5.7	3.4
7	5.7	3.4
8	5.7	3.4
9	5.9	3.5
10	5.7	3.4
11	5.7	3.4
12	5.7	3.4
13	5.6	3.4
14	5.7	3.4
15	5.9	3.5
16	5.6	3.4
17	5.5	3.3

*****PROJECT PASSES*****
NO EXCEEDANCES OF NAAQ STANDARDS ARE PREDICTED

CO Florida 2012 - Results
 Wednesday, December 17,
 2014
 Project Description

Project Title	I-4 PD&E Air Quality
Facility Name	Stantec
User's Name	Mike Holdsworth
Run Name	Segment 4 No-Build
FDOT District	5
Year	2040
Intersection Type	North Tee
Speed	Arterial 25 mph
Approach Traffic	Arterial 2116 vph

Environmental Data

Temperature	47.8 °F
Reid Vapor Pressure	13.3 psi
Land Use	Urban
Stability Class	D
Surface Roughness	175 cm
1 Hr. Background Concentration	5.0 ppm
8 Hr. Background Concentration	3.0 ppm

Results
 (ppm, including background CO)

Receptor	Max 1-Hr	Max 8-Hr
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1	5.6	3.4
2	5.8	3.5
3	6.1	3.7
4	6.0	3.6
5	5.9	3.5
6	6.0	3.6
7	6.0	3.6
8	6.2	3.7
9	6.2	3.7
10	6.1	3.7
11	6.0	3.6
12	6.0	3.6
13	5.9	3.5
14	6.1	3.7
15	6.2	3.7
16	5.9	3.5
17	5.8	3.5

 *****PROJECT PASSES*****
 NO EXCEEDANCES OF NAAQ STANDARDS ARE PREDICTED

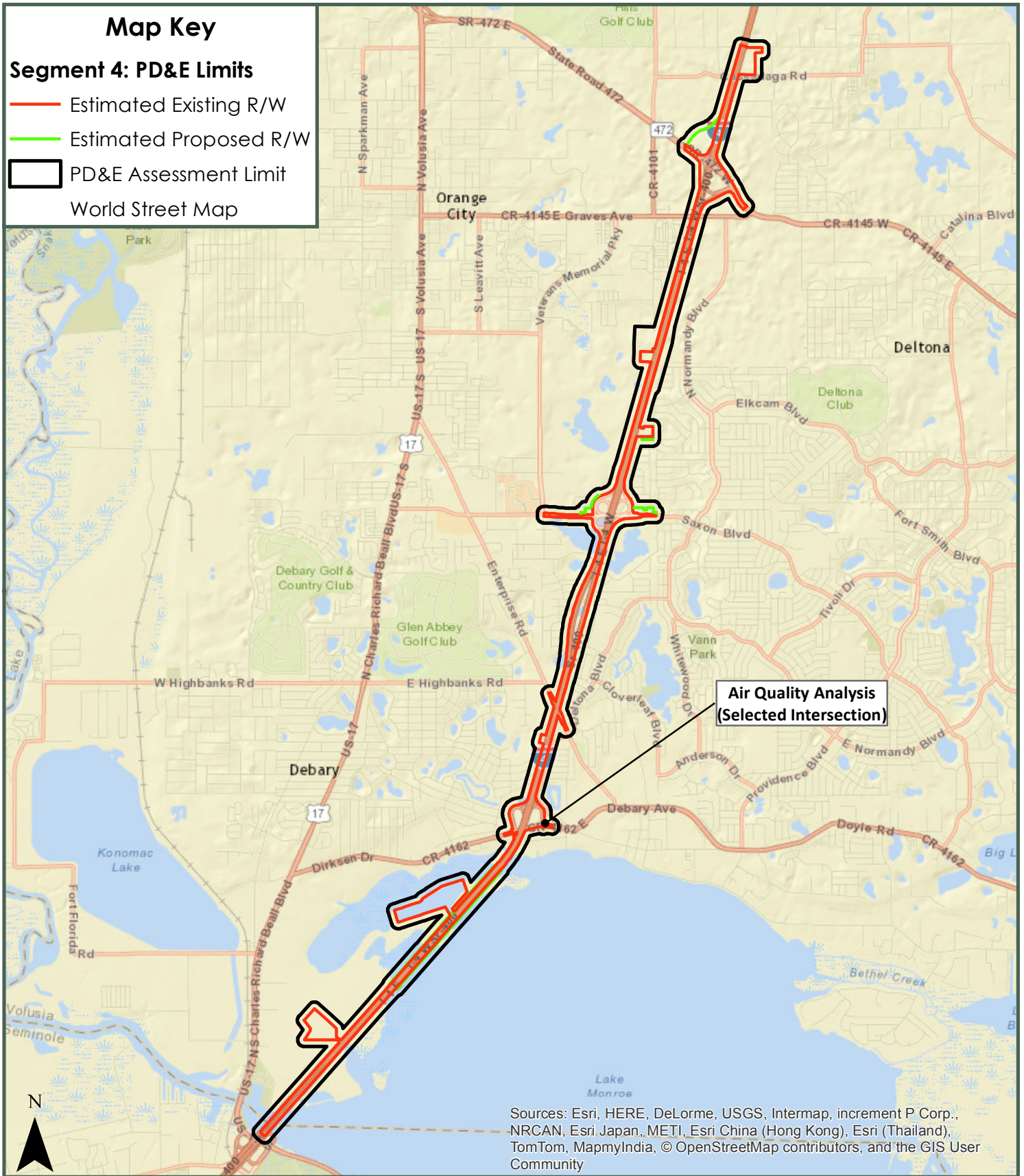


Figure 1

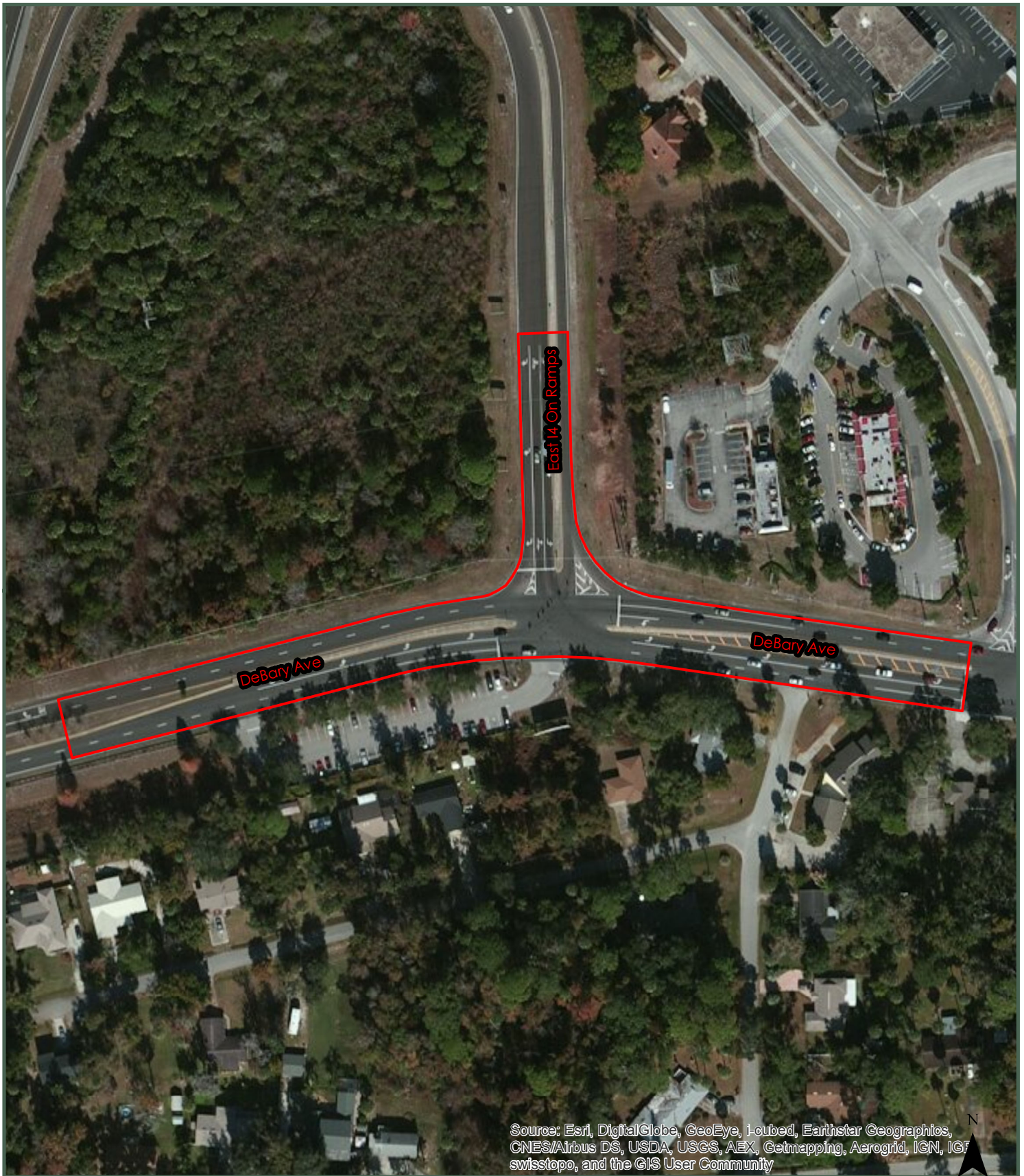


Figure 2